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XIV. *Experiments on Human Calculi. In a Letter from Mr. Timothy Lane, F. R. S. to William Pitcairn, M. D. F. R. S.*

Read May 5, 1791.

S I R,

IT will give me much satisfaction should the following experiments, made twenty years ago, so far meet your approbation, as to be thought worthy the notice of the Royal Society.

The Lixivium Saponarium of the late Pharmacopœia, prepared with the addition of so much lime as nearly to free the salt of tartar of its fixed air *, having been used as a medicine for the stone and gravel some years before, and its effects found very unequal, I thought it necessary to examine different calculi, then collected, both as to the effect of the above lixivium, and of fire, upon them.

Great disparity was observed; some being dissolved, and others scarcely altered in their figure.

When tried by fire, some were nearly evaporated by a red heat, and others retained their form.

Different parts even of the same calculus, varied considerably.

* See Letter to Dr. HEBERDEN, Medical Transactions, Vol. I. p. 112.

That I might be better informed of the above, the experiments were repeated both by fire and lixivium, with greater accuracy, as follows.

Fourteen specimens were selected, some of which were parts of the same calculus, and others different calculi.

In the experiments by fire I was favoured with the assistance of Mr. STANESBY ALCHORNE, of the Tower, to whom were sent ten grains of each, in separate papers, which were numbered.

The contents of each paper were placed in separate cupels, under a muffle, the same as is used by him for assaying gold and silver. The fire was raised gradually, till the furnace was fully heated: the time from raising the fire to the taking them out again was three hours, when it was concluded, that whatever volatile matter they contained was expelled.

The same quantity as above, of each specimen, being put into separate numbered phials, with one ounce measure of the lixivium in each, continued forty-eight hours; the phials were frequently shaken to forward the solution.

The clear liquor of each phial was decanted into fresh phials, and a quarter of an ounce more lixivium was added to such as were undissolved; after twenty-four hours they were poured out of the phials into separate filtering papers, each numbered, and the phials washed with distilled water, which was also poured into the papers, so that all that remained undissolved might be detained by the papers, which with their contents were carefully dried.

The remains of each

	Unfublimed.	Undiffolved.
	Grains.	Grains.
N° 1.	$1\frac{1}{2}$	$\frac{3}{4}$
2.	$2\frac{1}{2}$	2
3.	$\frac{1}{4}$	$\frac{1}{2}$
4.	$1\frac{1}{4}$	2
5.	$\frac{1}{4}$	0
6.	$3\frac{1}{2}$	$2\frac{1}{2}$
7.	$3\frac{1}{4}$	6
8.	6	$8\frac{1}{4}$
9.	$6\frac{1}{4}$	$6\frac{1}{4}$
10.	$6\frac{1}{4}$	$7\frac{1}{2}$
11.	$\frac{1}{4}$	$\frac{1}{2}$
12.	$\frac{1}{4}$	0
13.	$5\frac{1}{2}$	4
14.	6	$5\frac{1}{4}$

Appearances of each after Calcination.

N° 1. 3. 7. 8. left a fine white and soft powder.

N° 4. 5. 11. 12. left a white and gritty powder.

N° 2. 6. 9. 10. 14. were partly in powder white and gritty, with some lumps of a dark colour, as if not fully calcined.

N° 13. Of this the figure was not greatly altered; it remained hard, and part of it appeared as if inclined to flux.

After being in the lixivium forty-eight hours.

N° 8. 9. 13. 14. were found soft.

N° 7. and 10. remained hard.

These six were separately taken out of the lixivium and put into a mortar, and rubbed or broken, and then carefully returned to their separate phials before the second addition of lixivium, in order to forward the solution.

Specimens described.

N° 1. The external part of a laminated calculus, of a light yellowish brown colour *.

N° 2. The external part of a calculus, in colour like dirty tobacco-pipe clay †.

N° 3. A light-brown laminated calculus.

N° 4. and 5. Two specimens from one calculus; of which N° 4. is the external coat, of a dirty tobacco-pipe-clay colour.

N° 5. The internal part of N° 4., yellowish like N° 1.

N° 6. A calculus taken out of the urethra; a greyish white, inclining to yellow, of a porous texture.

N° 7. A calculus about the size of a nutmeg, taken from a child of a year old, given me by the late Mr. POTT; ash-coloured, in waves of different shades, laminated and hard.

N° 8. A dark-brown very hard calculus, of the mulberry kind.

N° 9. and 10. Two specimens from one calculus; of which N° 9. is the external whitish part, which appeared like a coat of calcareous earth, covering an irregular mulberry calculus ‡.

* The nucleus, so called, being the central part, was of a much deeper colour, and had been found not so soluble in lixivium as the light-brown part.

† The nucleus was of a bright yellow, and more soluble in lixivium than the whitish part.

‡ The covering of this calculus induced me to suspect that lime or lime-water might have been taken, and, by being decomposed by fresh urine, containing fixed air, form this covering. Other calculi have afforded the same suspicions.

In future, an account of medicines taken might afford much information, joined with the examination of different parts of large calculi taken out of the bladder.

N° 10. The brown mulberry part covered by N° 9. The three following are parts of one large, laminated calculus; of which

N° 11. Is the external lamina, of a brownish yellow.

N° 12. The central part, called the nucleus, of a pale orange colour.

N° 13. Some of the laminæ, between the nucleus and the external coat, of a sparkling appearance.

N° 14. A whitish, porous, and easily broken calculus.

The experiments by fire explain the unequal accounts of authors, respecting the component parts of calculi.

In general, those which contain the largest proportion of volatile parts were most soluble in lixivium.

The insolubility of some explains the want of success in several cases, where lixivium, soap, and lime-water, have been given as remedies.

The solubility of others, joined with the testimony of reputable authors, and my own experience for near thirty years, confirm the salutary effects of lixivium in many cases.

It frequently happens, in fits of the gravel and stone, that gravel or small pieces of calculi are discharged, which should be examined.

If perfectly soluble in lixivium (*Aq. kali puri*), the remedy is obvious; if imperfectly, doubtful; if insoluble, lixivium will only irritate, without benefit.

I am, &c.

T. L A N E.

Aldersgate-street,
March 10, 1791.

